

REPORT

Millennium Science Initiative

External evaluation mission in Chile

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Introduction

The independent panel has completed its evaluation according to the Terms of Reference given to it. The objective was to evaluate and report on the activities and management of the MSI programme in Chile in the year 2000. The evaluation will cover all elements of the MSI (Institutes, Nuclei, Executive Secretariat, and Programme Committee), as well as review the MSI Programme as a whole. Clearly, the panel, lacking the requisite scientific breadth and expertise, cannot possibly cover in depth all scientific fields, and therefore the evaluation cannot be considered a detailed peer review for each one of the centres of the MSI. The on-sites tasks of the panel were undertaken between March 18 and 24, 2001, including site visits to all awarded projects (3 Institutes and 5 Nuclei) and meetings with academic authorities, members of the Executive Secretariat, and with the Vice-Minister of MIDEPLAN.

The panel took into account the first evaluation report (dated March 2000) which concentrated on the launching of the initiative, the call for proposals, the selection process, and the management structure.

The evaluation panel calls attention to the assistance it has received from the Executive Director and his staff, with timeliness and efficiency both before and during the visit to Chile; this support has been pivotal in enabling the panel to complete its charge.

Achievements of the MSI Programme

After careful analyses of the information and results deriving from the site visits, close examination of the MSI annual report provided by the Executive Secretariat, reference to and appreciation of the initial objectives of MSI, and a meeting with the Executive Secretariat, the panel is in a position to evaluate the MSI programme as a whole, and to suggest in addition a number of possible improvements in its procedures.

Despite the short time period during which it has been in operation, the panel believes that the MSI has successfully initiated programs that promote excellence in scientific research and establish strong initiatives in co-operation and collaboration within the scientific community. These programs now serve as foci that assemble, integrate and encourage some of the finest young scientific talent in the country. The MSI centres, in general, provide a nurturing environment for the development of young scientists, enable researchers with shared interests to reach critical mass, and derive further benefits in terms of shared resources and their efficient use.

We have observed that, although the interests of the scientists involved in Institutes and Nuclei are very diverse, MSI funding has provided a superstructure under which collaborative efforts, in research, training, and beyond, can be realised. We believe that MSI funding has provided the canopy under which the different groups find, share, and mutually advance their common interests. Within the new associations, research productivity is high and often in novel areas; with few exceptions, publications are not only numerous but of high quality and appear in top ranking journals. Relatively modest investments have been surprisingly effective.

In general, MSI-funded allocations integrate well with the many and diverse grants awarded to individual group members from other sources; these non-MSI funds clearly are also indicative of high quality research that is so recognised by the granting agencies. The panel encourages acknowledgement of the MSI-supported component of jointly-supported research efforts.

The panel is impressed by the programme results, which are visible after only one full year of activities. We consider the MSI programme as a whole to be very successful. In particular, the panel applauds the incorporation of so many young scientists into MSI initiatives, consistent with the goal of increasing the size and integration of the Chilean scientific community and ultimate retention of its constituent members. This applies also to the incorporation of Chilean scientists working abroad into these national scientific endeavours.

MSI-funded activities in the Institutes and Nuclei

Prior to the site visits, the panel received, in electronic form, the annual reports from the MSI centres as well as that from the Executive Secretariat. The reports were relatively consistent in format and content, indicating (as confirmed later) that adequate instructions on a reporting format had been provided to the centres' directors, and had been broadly followed. Most of the annual reports supplied adequate information to the panel on progress and achievements, although in a few cases additional information was sought from and provided by the Executive Secretariat, or was requested and received during the site visits.

All reports covered progress in research and training, networking and outreach, and management issues. We appreciated the consistency in the reporting format, and recommend that it is maintained in the future (without compromising a necessary flexibility to encompass unforeseen events).

The panel paid site visits to all 3 institutes and 5 nuclei. Because the reports were comprehensive, most of the time during the visits was devoted to discussion and clarification. Meetings were attended by the senior scientists, and in most cases young researchers and graduate students were also interviewed.

On the basis of information and evidence provided in the annual reports, together with additional data, views and impressions gathered during the site visits, the overall consensus of the panel has been a very positive affirmation of the MSI programme.

In all cases, the senior scientists of institutes and nuclei alike considered that collaboration and integration in research goals was the most important achievement of the year 2000. Remarkably, this feeling was shared by the post-doctoral and graduate students to whom we spoke. The panel confirms that these primary objectives have been achieved, and both scientists and panel members are convinced that this has been possible only through the MSI and the funding it has provided. Indeed, in the case of the independent CECS in Valdivia, it appears that the very existence of this Centre, as it is now configured, is owed to the MSI.

During this first year, most groups have maintained or enhanced a remarkable scientific productivity, measured by publication rates in high level journals. Amongst centres taken individually, however, the situation is less consistent. All acknowledge that such productivity is not entirely attributable to the MSI, but the support of the initiative is recognised as crucial in many cases. Further, all participants predict even higher productivity in the next and subsequent years, as obstacles that are initially encountered are subsequently overcome. With regard to scientific presentations in seminars, symposia, congresses, meetings, etc., nearly all groups show high activity levels that have contributed extensively to group visibility in the professional arena. The MSI is widely acknowledged as an important facilitator of these activities.

While the quality and quantity of scientific productivity jointly by the members of the three Institutes is remarkably high, this measure of performance in the five smaller nuclei necessarily must be gauged on a smaller scale. There also productivity has been quite satisfactory, but we note deviations from expectations, in both directions, under individual accounts of the MSI centres reported below (Annex). The panel applauds the fact that one institute has undertaken the patenting of some of their innovations.

Concerted efforts toward the training of young scientists have been exerted by all groups, not only in terms of postgraduate teaching but also promoting high level courses with international participation. In addition, young researchers (from graduate to postdoctoral students) have been incorporated broadly into the various research teams. The panel believes that these activities are very important, and will bear fruits in the years to come. We also expect to see increases in the number of graduate and postdoctoral students as these centres mature.

With regard to the MSI networking proviso, all groups have organised this aspect of their activities in different ways. We would like to highlight the ambitious networking efforts underway in the three Institutes of an international nature. These are designed to reach and identify Chilean scientists working abroad, at both post- and pre-doctoral levels, and to incorporate them into Institute activities. The panel endorses networking activity as a strong component of the MSI mission, well worthy of the time and effort entailed.

The challenges of generating an outreach component in MSI centres, in terms of developing contacts and productive interaction with industry, the private sector, and society at large, have been met by the different groups with variable success. Some centres have web sites already operational that will facilitate both networking and outreach. However, most centres have been rather surprisingly backward in this regard, and we see much potential for enhancing this aspect of the mission via the internet, both among persons and organisations. Below we identify some nuclei that allow some considerable room for improvement relative to networking and outreach.

(N.b. more detailed information on individual institutes and nuclei is provided in the Annex).

Remarks on the management of the MSI Programme

We acknowledge the important role played by the World Bank in getting the MSI up and running effectively. However, we understand that some rather bureaucratic constraints may be due to World Bank protocols. In addition to this, a program such as MSI requires a great deal of autonomy of operation, and this appears not to be the case within MIDEPLAN. We feel that MIDEPLAN also requires excessive details with regards to expense reporting. We would therefore recommend, as last year evaluation panel did, that as many of these obstacles as is feasible be circumvented. Another example is given by the prerequisite for insurance coverage for individual awardees prior to receipt of public funds; the potential for group insurance coverage of MSI participants seems worthy of further exploration.

The panel learned from the MIDEPLAN Vice-Minister that the ministry is wholeheartedly supportive of the MSI. The panel perceives this to be an accurate representation of ministry support, and believes that the MSI programme should therefore enjoy far more autonomy within MIDEPLAN, with a view to enhanced management performance and in turn a smoother operation of the programme's scientific activities.

While last year's panel detected that a certain discomfort was felt by the various institutions that host MSI centres, we sense currently that such reticence is now largely overcome. Naturally a shift in this direction was needed, and further improvement of relations between hosts and centres will require further good will and an expressed desire for accommodation on both sides.

All MSI centres have relayed to the panel their disappointment in having received during the year 2000 only about 40% of the approved funding (amounting in most cases to about 30% of that requested). Such sizeable cuts have altered the recipients' initial plans, and in some cases their strategies for progress and development. The panel recognises the difficulties that budgetary constraints have imposed, and hopes that the first year's budget cuts will appear as supplements to the second year allocations.

The panel warns that any discontinuity in funding after the commitment of the World Bank expires (in early 2002), through insufficient allocation of funds by the Chilean Government, would leave large numbers of top scientists in a professional limbo. That is, the establishment of programmes that early prove their success, followed in the short term by their subsequent dis-establishment, would unavoidably have a strongly negative connotation within the scientific community. The immediate effect would be the creation of a damaging lack of confidence in the system. We stress, therefore, the need for sufficient financial backing and a stable prognosis for its delivery over the longer term.

The panel is equally concerned about there not having been enacted a second call for proposals. As stated in the first evaluation report (March 2000), research groups whose initial applications to MSI were unsuccessful expressed both desire and willingness to re-apply when possible. In our opinion, the early successes of existing MSI ventures will reinforce the perceived value of this unique funding scheme. A failure to launch a second call for proposals in the near future will miss an opportunity to capitalise on the momentum that MSI presently enjoys. Furthermore, a medium-term scheme incorporating regular calls for proposals is essential to guarantee that MSI reaches its full potential and impact. This is, of course, presupposes that, in accordance with and continuance of the MSI's stated goals, only high quality research proposals will be considered, and only the best considered eligible for funding.

Among a number of categories that would clearly benefit from MSI support, and which would complement the range of existing programmes and more adequately span the breadth of research endeavours, we mention the following:

- a) MSI supports largely theoretical studies in physics, further growth in the experimental arena is needed, with immediate application to modern industry such as telecommunications and computing.
- b) MSI supports a single nucleus in chemistry, whereas the chemical industry plays a central role in every strong economy.
- c) MSI support is strong in molecular, cell and developmental biology and neurobiology, but a single nucleus represents the remaining wide range of biology. Whole-organism biology, behaviour, ecology, environmental and evolutionary biology are conspicuously unrepresented, yet are likely to be critical research areas as environmental deterioration continues and natural resources decline.

- d) MSI does not support centres focussed on research in natural resources, natural hazards, and global change. These areas are all relevant to Chilean society, indeed are essential from the viewpoint both of the economy and of quality of life. Thus Earth Sciences might make a valuable addition to an expanded MSI programme.

The panel is aware that MSI is located in MIDEPLAN rather than in the Ministry of Education, and attaches significance to this arrangement. Although we consider that this is basically an internal matter, we emphasise that, without exception, all of the scientists benefiting MSI funding find the present situation appropriate and advantageous. The panel opinion is that a diversity of funding sources is a desirable situation, as shown in larger and scientifically stronger countries. It bears no implication of "double-funding," but rather of complementary funding opportunities. However, the panel warns that effective co-ordination and transparency among the available funding schemes, regardless of their administrative bases, is a must for a small science and technology community such as the Chilean one comprises.

There has been a notable coincidence of opinion, expressed by all scientists with which we have had the occasion to speak, on the excellent task carried out by the Executive Secretariat. This satisfaction includes the availability of the secretariat, and their willingness to overcome day to day obstacles as well as reduce as far as they can the bureaucracy inherent to the administration system.

The panel has not had the occasion to meet members of the Programme Committee (PC). Since no call for proposals was issued during the year 2000, the activity of the PC has been limited. However, it is our understanding that the PC has continued to act in an advisory role to the Executive Secretariat as appropriate, and has supported the MSI through its contacts with Chilean authorities.

Summary Remarks

Cognisant of the objectives of the MSI as originally documented, the evaluation panel affirms that the initiative is now operational, though as yet it has been fully functional for only a short time. Despite some flaws in the early implementation of the initiative (see first evaluation report, March 2000), the achievements of the Institutes and Nuclei are well within the expectations of the Programme.

Conspicuous among the achievements of the MSI programme are those with respect to collaborative efforts. The incorporation of substantial numbers of young researchers is especially gratifying. In some cases, senior Chilean scientists working abroad have been incorporated in various ways into MSI centres. MSI funds enable the construction of a superstructure under which collaborative research efforts become possible; they integrate with and complement funds from the traditional granting agencies.

The amount and quality of the research and training now ongoing is eminently satisfactory for the first complete year of operation. The same applies to networking activities; outreach accomplishments are more inconsistent. The panel wishes to emphasise that the range of achievements to date verify the substantial personal efforts that have been invested in the initiative; there is general and widespread enthusiasm among the participants for the MSI enterprise.

The panel recommends continuity of the MSI Programme, with stable and regular financing and renewed calls for proposals. The panel regrets that so far the investment by the Government of Chile has not yet honoured the commitments made at the time of launching the MSI.

The panel recommends continued efforts to reduce bureaucracy in administration and financial management.

Overall, the MSI has helped foster a new level of commitment among Chilean scientists to engage in collaborative and co-operative research, to pool resources for more effective training programmes, and to more fully engage various public sectors with national scientific activities. To us, these remarkable advances justify strong support for the programme and, further, its expansion into other important areas of the natural and physical sciences that are presently not represented under the MSI aegis.

Position and field of expertise of panel members – a note from the Executive Secretariat:

Dr. Enric Banda (Geophysics), Secretary General European Science Foundation (member of the previous evaluation mission)

Dr. Martin Cody (Ecology-Biodiversity), Full Professor University of California-Los Angeles

Dr. Mario Luxoro (Biology), Full Professor University of Chile and Chilean Award in Sciences year 2000

Dr. José Onuchic (Physics), Full Professor University of California-San Diego

Dr. Luis Oro (Chemistry), Full Professor University of Zaragoza and past elected member of the European Science and Technology Assembly

Annex

INDIVIDUAL COMMENTS ON INSTITUTES AND NUCLEI

Institutes

Advanced Studies in Cellular Biology and Biotechnology (CBB)

Director: Ricardo Maccioni Baraona.

This Institute is comprised of an exceptionally strong group of eight senior scientists and five younger ones. Of the scientists involved, six have received "Science Presidential Chairs" in their own specialities. The diversity and strengths of the Institute are made evident by its outstanding record of 62 papers, of which some 36 can be considered MSI papers. The publications are not only numerous but of very high quality, most of them in top journals.

The achievements and collaborative advances of the Institute are remarkable. The panel met with about 50 investigators and students, all of whom expressed their satisfaction for the MSI support and the advantages it has conferred.

There are clear indications that not only the senior scientists but also the graduate and post-doctoral students are enjoying their new collaborative interactions in advanced research into areas of basic and applied biological and biomedical research, including contemporary problems in society such as Alzheimer's Disease and the Biology of Ageing.

The Institute has successfully developed international courses and conferences as well specific programs for upgrading the science background of teachers and scientific journalists.

The panel recognised, and welcomed, the formation of an International Institute Advisory Board integrated by top international scientists. Our overall conclusion is that, to date, the Institute has done an excellent job and promises a bright future.

Centre for Scientific Studies (CECS)

Director: Claudio Teitelboim Weitzman

CECS is the only MSI-funded unit that is independent (non-university affiliated) and conspicuously "decentralised" (in Valdivia), although there are strong ties with the local Universidad Austral, the University of Concepción, and universities in Santiago and Valparaíso. Two groups of first class scientists are operational in Valdivia. Theoretical Physics plus Biophysics/Molecular Physiology. The review panel met with four (of six) principal investigators and five (of six) junior members, and a large majority of the post-doctoral and graduate student researchers.

Although CECS has been *in situ* for a little more than a year, the biological laboratories are fully functional, staffed, and active--an noteworthy achievement. The research productivity of both groups is impressive, in quality, quantity, and extent of national plus international input. Worth mentioning are the text series (Plenum; Oxford University Press) comprising state-of-the art syntheses on physics (black holes; supergravity) and biophysics themes, four publications in the premier journals *Physics Review Letters* and *Physics Letters*, and an article in the prestigious *Proceedings of the National Academy of Sciences USA*. Productivity can confidently be expected to rise after the facilities (and faculties) are completed, and we recognise a potential for cross-fertilisation and possibly collaboration between the physics and biophysics groups. As biology in this new millennium becomes more quantitative, we are starting to observe a stronger interplay between physics and the life sciences; this institute is in a unique position to make advances in this direction.

While CECS is geographically and administratively somewhat dissociated from other Chilean research institutions, this has been treated as an asset rather than a liability, and emphatically has not comprised its training mission. It has drawn excellent post-graduate students from the best national and foreign institutions. These students expressed their abundant enthusiasm for the informal and stimulating atmosphere of their workplace, where the spirit of intellectual exploration is fostered by accessible advisors giving freely of their time, expertise, advice and facilities.

CECS is in the process of adding a third field of expertise, Glaciology, that exploits the institute's geographical position near the southern ice-fields, and its contacts with the defence ministries on both Chilean and Argentina sides of the border, as well as national experts in the field. In Astrophysics, a fourth field, positions (numbering 3) are being filled currently.

It is clear that, uniquely among the MSI institutes and nuclei, CECS would not cover the breadth of its current activities, nor likely exist, without MSI support, which will remain critical to the institute's further development to full potential. CECS is becoming an integral part of the city and is a most valuable resource for the Universidad Austral and indeed for the southern regions of the country.

Fundamental and Applied Biology Institute (MIFAB)

Director: Pablo Valenzuela Valdés

This large group of senior scientists belong to three different organisations or academic entities. It is a conspicuous achievement that such scientists, each eminent on his own right and with independent facilities and funding, should find much common ground. Yet there is a prevalent mood of rapport and collaboration among the seniors, who readily acknowledge the importance of MSI funding in bringing the collaborative efforts under the Institute (MIFAB) umbrella.

In molecular biology, in several aspects there are clear synergistic advantages to uniting the activities of otherwise disjunct groups. This was convincingly relayed to the panel; the MIFAB seniors show every appearance of enjoying their newly formed common interests and shared endeavours.

The research of the group is very strong, the publications record is excellent, and it is visible in the best journals. Notably, a number of new genomic patents are being prepared for registration abroad.

MSI funding has provided the canopy under which the different laboratories find, share, and mutually advance their common interests. MSI funding has been used to serve different ends that were otherwise unmet: to complete student salaries, fund trips to meetings, provide equipment, plus generally to enhance external contacts and the programme's flexibility.

Among creative networking advances is a goal to contact and unite in a common data base Chilean students in foreign laboratories, thereby enhancing these students' involvement with the best national science. Students within the institute are particularly happy with diverse interactions among the group, and access to advice, expertise and equipment not otherwise available. Some remarkable outreach activities connecting with public and private Chilean sectors are related to salmon farming, the red tide problem of fisheries, and public health threat of Hantavirus.

A conversation with 3 junior scientists was equally encouraging and confirmed the comments above.

Nuclei

Advanced Studies Centre for Ecology and Biodiversity ***Head Researcher: Mary Kalin Arroyo***

This Centre is comprised of an exceptionally strong group of scientists. Although their interests are very diverse, MSI funding has provided a superstructure under which significant collaborative efforts, in research, training, and beyond, are being realised. The reviewers met with the three principals and all of the core younger scientists on the Santiago campus. While facilities are dispersed, and of variable quality and extent, the group benefits from shared resources, and from new cross-fertilisation of ideas and projects under the MSI association, although integration should be reinforced.

The diversity and strengths of the Centre researchers is portrayed well by its outstanding record of recent publications (40% of those listed indicate significant MSI support). The publications are not only numerous but of high quality and appear in the most reputable journals.

The success of the group as a collaborative Centre is attributable, it seems, to the ability of the principals to allocate deftly the relatively small financial resources among minor needs, needs that collectively make a large difference to the whole. Equipment for the younger scientists and funds for graduate student support are two of several importance budgetary categories that have made major impact to the group's performance. More resources would clearly make yet larger impacts. Fund allocations integrate well with several major grants from other sources, and serve to expand the utility of these other funds in a complementary fashion.

The Centre's principals acknowledge broad satisfaction with the MSI executive, but hope that further streamlining of administrative and budgetary processes may be achieved in upcoming times.

We note that this nucleus is in effect of institute size and scope; some consideration of a status "upgrade" might be appropriate in the future.

Millennium Nucleus in Development Biology (MNDB)

Head Researcher: Roberto Mayor Caro

This Nucleus comprises three groups (4 senior scientists) with 3 post-doctoral and three post-graduate students; MSI has made possible some progress in collaboration among the leaders of the three groups. To do this, they have overcome a number of difficulties during the year 2000, and in this process their original objectives have been modified and their strategy reformulated. Although the panel is aware of the long-term nature of this research we would have expected some more productivity both in articles published and in research presentations to congresses and meetings.

The panel had the opportunity to converse with a post-doctoral student who sounded very pleased with the facilities and support he has received so far.

Networking activities were concentrated in an international course on Environmental Genetics, which apparently was highly successful. This was seen not only because of the well-received course contents, but also because of the network of e-mails and contacts that it has since generated. This is considered by the group to be a useful way to stimulate interest in, and scientific involvement with, topics in developmental biology.

The panel perceived a certain lack of leadership in the group, which may compromise its potential for future accomplishments. This perception, together with an unsatisfactory level of scientific productivity, prompts the panel to recommend that the group's progress and activities should be followed closely in the upcoming months.

Valparaíso Cellular and Molecular Neuroscience Center (CNV)

Head Researcher: Alan Neely Delgueil

This is a rather unique enterprise, which uses as a core concept the development of a new research line. Its creation assembles, at the University of Valparaíso, a group of scientists that otherwise would certainly not be working collaboratively, almost certainly would not be working at the same institution, and probably would not even be working in Chile.

Thus we are seeing created *de novo* an extensive research facility for work on neurophysiology, including biophysical, cellular and subcellular approaches, using the vehicle of the zebrafish retina. While each of the three principals has substantial research achievements, the intent of the group is that, at variance with other MSI centres, we consider only the development of their new, and common, research theme. The research has not yet reached the production phase in terms of published work; however, we mention again that the scientific productivity of the participants, each within their own research lines, can be qualified as excellent.

Space has been acquired and fitted out; a zebrafish rearing facility has been equipped, and the first 5 generations of fish are successfully bred. A capacity to extract and prepare zebrafish retinæ has been virtually refined, and in 2001 the research will be fully launched.

As yet there is no product--only a system now fully primed for production. Technicians and students alike have been trained by the principals for their jobs in the research programme: 2 technicians, and 4 MSc students that will likely become PhD students. Research of this calibre is a novelty at the University of Valparaíso and the panel supports its encouragement and endorses the substantial progress made to date.

Dispersed Metallic Systems. Applications to Fine Chemistry
Head Researcher: Patricio Reyes Núñez

This group has benefited from the Millennium funding, to start with, because it has permitted establishment of a previously non-existent collaboration among the 3 senior scientists, all faculty members of the University of Concepción. The panel considers the association very positive, as it has provided a critical mass that can undertake more challenging research. The acquisition of new equipment has also contributed to the collaboration and facilitated joint activities. New lines of research are thereby initiated.

The group, in the panel's view, has high productivity. We recommend, however, that the nucleus scientists work toward a selection of more ambitious targets, in line with what we consider their greater potential.

Training activities are considered to be adequate in terms of quality and quantity. We believe the young scientists in the group will be eligible eventually to compete successfully for jobs elsewhere in the academic world or in industry.

As far as networking and outreach are concerned, the panel approves the range of international contacts established by the group, but recognises that there is room for improvement, particularly with regard to the group's potential contacts with industry. The nucleus actively participated in the organisation of the first Chilean meeting on Catalysis and Adsorption; it has worked to disseminate information on research activities among students, including those at the high school level, and among the public at large.

During our site visit it was apparent that the group receives very strong endorsement from the University of Concepción, whose authorities have been receptive and supportive of their MSI nucleus.

Condensed Matter Physics

Head Researcher: Patricio Vargas Cantin

This nucleus is comprised of a group of six senior scientists and four younger ones from five different Chilean universities; the nucleus is geographically dispersed. During the initial funding period by MSI, the group has been strengthened by the incorporation of five new collaborators, and ten graduate and two undergraduate students, all of them participating actively in the group. The diversity and strength of the nucleus is made evident by the participation of both theoretical and experimental physicists, all sharing a common interest and pursuing research in condensed matter physics. However, the research programme is heavily focused in theory. The panel feels that it would be desirable for Chilean physics if a stronger experimental effort be developed to complement the theoretical side of the studies.

The panel met with eight of the ten scientists and, separately, with two graduate students and a postdoctoral fellow. While facilities are dispersed and experiments are performed only in Santiago and Valparaiso, the group appears to integrate well, amongst themselves and with other scientists in Latin America, USA and Europe; their national and international collaboration networks have been stabilised.

The overall scientific productivity of this nucleus has been excellent (19 MSI manuscripts submitted for publication in good scientific journals; 12 already been accepted for publication). A substantial increase in the collaborative papers is expected in the near future. Participation in international meetings has been both stimulating and successful, and additional relevant activities include workshops for graduate students.

The success of the nucleus is attributable, it seems, to the ability of the principals to allocate flexibly the relatively small financial resources among several needs, with additional monies coming from each member's independent research funds. More resources would clearly make yet larger impacts.

The nucleus has made remarkable efforts in dissemination of the importance of condensed matter physics, at all levels; it expects to see the number of undergraduate, master's and doctoral students grow substantially in the near future. However, more outreach related with the industrial sector would be desirable.